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Dresden, 14 July 2016
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Test Report
Order No. 2716205

Client:	Probos – Plásticos, S.A. Vila do Conde 4486 – 851 Mindelo Portugal
Date of order:	23 June 2016
Order:	Performance of tests on plastic edge band
Contractor:	EPH – Laboratory Surface Testing
Engineer in charge:	Dipl.-Ing. (FH) M. Peter

i. V.

Dr.-Ing. Rico Emmler
Head of Laboratory Surface Testing

The test report contains 6 pages. Any duplication, even in part, requires written permission of EPH. These test results are exclusively related to the tested material.

1 Task

The accredited laboratory Entwicklungs- und Prüflabor für Holztechnologie GmbH (EPH) was commissioned by Probos – Plásticos, S.A. in Mindelo / Portugal to carry out different tests on plastic edge band.

2 Test material

For the test, the client has sent the following variants on plastic edge band (receipt at the EPH-laboratory: 24 June 2016).

Variant	Name of samples by the client	Test pieces/ dimensions [mm]
1	3806259BW260040	1 / A4 x 2
2	3304017BM4100HG	1 / A4 x 1
3	33028152A27504G	30 / A4x 0,4
4	38117317W260040	30 / A4x 2

3 Test performance

3.1 Determination of the resistance to chemical agents according to DIN 68861-1:2011

The test was carried out according to EN 12720:2014 for the level of use 1 B. The classification was carried out according to DIN 68861-1:2011.

3.2 Determination of the resistance against scratching according to EN 15186:2012 procedure B

The test was carried out according to DIN EN 15186:2012 procedure B with a universal Scratch Tester Model 413 of the Company Erichsen. The classification was carried out according to DIN 68861-4:2013 and CEN/TS 16209:2011.

3.3 Light fastness test according to DIN EN ISO 4892-2:2013

The light fastness test was carried out with a Xenon Weather Ometer Ci3000+ (test device - KL 55) according to EN ISO 4892-2:2013 using the following parameters:

- in synchronism
- Test method B, Cycle 2
- Irradiation conditions behind window glass
- (65±3) °C black standard temperature (BST)
- (50±10) % relative humidity
- Rate of irradiance (50±2) W/m² in the wavelength range 300-400 nm

The exposure was continued until the contrast between the unexposed and exposed areas of the blue wool lightfastness types of stage 6 is equal to the grey scale number 4. Also preliminary assessment on blue wool scale 4 with the some procedure was done.

Light fastness values were determined according to EN 15187.

3.4 Determination of the density according to EN 323:1993

The density was determined according to EN 323:1993 "Wood based panels – Determination of density". 10 specimens of 50 mm x 50 mm x thickness were tested. The density was calculated by the use of measured values of length, width, thickness and mass of the specimens.

3.5 Determination of tensile strength according EN ISO 527-3:2003

The determination of tensile strength was carried out according to ISO 527-3:2003 "Plastics – Determination of tensile properties – Part 3: Test conditions for films and sheets" at tensile test device.

The test specimens were prepared according to ISO 527-3, picture 1 (specimen type 2). The length of the test specimens was 180 mm. The width of the specimens was 10 mm. 5 specimens cut parallel to production direction and 5 specimens cut perpendicular to the production direction were tested per variant. The tensile strength was calculated according to ISO 527-3. The rate of application of tension was 3 mm/min in case of variant 3 and 5 mm/min in case of variant 4.

4 Results

4.1 Resistance to chemical agents according to DIN 68861-1:2011

Test agent		Results for level of use 1 B			
		D	R	Variant 3	Variant 4
1	Acetic acid	**1 h**	**5**	5	5
2	Citric acid	**1 h**	**5**	5	5
3	Ammonia solution	**2 min**	**5**	5	5
4	Ethanol, non denatured	**1 h**	**4**	5	4
5	Red wine	**6 h**	**5**	5	4
6	Beer	**6 h**	**5**	5	5
7	Cola	**16 h**	**5**	5	4
8	Coffee	**16 h**	**5**	5	3
9	Black tea	**16 h**	**5**	5	3
10	Black currant juice	**16 h**	**5**	5	5
11	Milk, condensed	**16 h**	**5**	5	4
12	Water	**16 h**	**5**	5	4
13	Gas for cleaning	**2 min**	**5**	5	5
14	Acetone	**10 s**	**2**	5	5
15	Ethyl /butyl acetate	**10 s**	**2**	5	5
16	Butter	**16 h**	**5**	5	4
17	Olive oil	**16 h**	**5**	5	5
18	Mustard	**6 h**	**5**	5	3
19	Onion	**6 h**	**5**	5	3
20	Disinfectant	**10 min**	**5**	5	5
21	Cleansing agent	**1 h**	**5**	5	5
22	Cleansing solution	**1 h**	**5**	5	5

D - Duration of exposure
R – Requirement (Grade)

Test agent		Results for level of use 1 C		
		D	R	Variant 4
1	Red wine	**10 min**	**5**	5
2	Beer	**10 min**	**5**	5
3	Cola	**10 min**	**5**	5
4	Coffee	**10 min**	**5**	5
5	Black tea	**10 min**	**5**	5
6	Black currant juice	**10 min**	**5**	5
7	Milk, condensed	**10 min**	**5**	5
8	Water	**10 min**	**5**	5
9	Disinfectant	**2 min**	**5**	5
10	Cleansing solution	**2 min**	**5**	5
D - Duration of exposure **R – Requirement (Grade)**				

Grade 5 *No change*
A difference between the test area and the adjoining area cannot be detected.

Grade 4 *Slight change*
The test area can only be differentiated from the adjoining area if the light source is reflected from the test area back to the inspector's eye, e.g. discolouration, changes in gloss or colour.
No changes in the structure of the surface, e.g. swelling, fibres rising, cracking, blistering

Grade 3 *Moderate change*
The test area can be differentiated from the adjoining area, visible from various perspectives, e.g. discolouration, changes in gloss or colour.
No changes in the structure of the surface, e.g. swelling, fibres rising, cracking, blistering

Grade 2 *Considerable change*
The test area can be clearly differentiated from the adjoining area, visible from all perspectives, e.g. discolouration, changes in gloss or colour, and/or the surface structure has slightly modified, e.g. by swelling, fibres rising, cracking, blistering

Grade 1 *Strong change*
The surface structure has clearly changed
and/or discolouring, changes in gloss or colour
and/or the surface material has loosened partially or completely
and/or the filter paper keeps sticking to the surface.

4.2 Resistance against scratching according to EN 15186:2012 procedure B

Variant	Scratching load in N, which causes an in itself closed mark		Level of use (LU) according to DIN 68861-4:2013	Level of use (LU) according to CEN/TS 16209:2011
	Single values	Mean value		
3	1.2, 1.2, 1.2	1.2	4 D	C
4	1.8, 1.8, 1.8	1.8	4 C	B

LU according to DIN 68861-4:2013

LU 4 A	> 4,0 N
LU 4 B	> 2,0 bis ≤ 4,0 N
LU 4 C	> 1,5 bis ≤ 2,0 N
LU 4 D	> 1,0 bis ≤ 1,5 N
LU 4 E	> 0,5 bis ≤ 1,0 N
LU 4 F	≤ 0,5 N

LU according to CEN/TS 16209:2011

LU A	≥ 2,5 N
LU B	]2,5 bis 1,5] N
LU C	]1,5 bis 1,0] N
LU D	]1,0 bis 0,5] N
LU E	< 0,5

4.3 Light fastness test according to DIN EN ISO 4892-2:2013

Variant	Test piece	Change of sample colour in grey scale No due to colour change of blue wool light fastness types		Light fastness as grades of the blue wool scale according to EN 15187
		4	6	
1	1	5	4.5	> 6
	2	5	4.5	> 6
2	1	4.5	4	= 6
	2	4.5	4	= 6
2	1	5	4.5	> 6
	2	4.5	4.5	> 6
4	1	5	5	> 6
	2	5	5	> 6

Rating scale for evaluating the color change using the gray scale:

Grey scale N° 5	no change of colour
Grey scale N° 4,5	very small change of colour
Grey scale N° 4	small change of colour
Grey scale N° 3,5	recognisable change of colour
Grey scale N° 3	clearly recognisable change of colour
Grey scale N° 2,5	very clearly recognisable change of colour
Grey scale N° 2	strong change of colour
Grey scale N° 1	very strong change of colour

4.4 Density according to EN 323:1993

Variant	density in g/cm³ according to EN 323:1993 (n = 10)
3	1.37
4	1.40

n = number of specimens

4.5 Tensile strength according EN ISO 527-3:2003

Variant	Orientation of test specimens	Tensile strength in MPa (n = 5)	Mean value of tensile strength in MPa (n = 10)
3	parallel to production direction	40.1	36.7
	perpendicular to production direction	33.4	
4	parallel to production direction	36.8	34.4
	perpendicular to production direction	32.1	

n = number of specimens

5 Evaluation

Variant	Property	Classification in classes according to DIN 68861-1:2011 DIN 68861-4:2013	Classification in classes according to CEN/TS 16209:2011
3	Resistance to cold liquids according to DIN 68861-1:2011	1 B	-
4		1 C	-
3	Resistance against scratching according to EN 15186:2012 procedure B	4 D	C
4		4 C	B

Variant	Property	Results
1	Light fastness test according to DIN EN ISO 4892-2:2013	Change colour in grey scale: 4.5 Light fastness according to EN 15187: > 6
2		Change colour in grey scale: 4 Light fastness according to EN 15187: = 6
3		Change colour in grey scale: 4.5 Light fastness according to EN 15187: > 6
4		Change colour in grey scale: 5 Light fastness according to EN 15187: > 6
3	Tensile strength according to EN ISO 527-3	36.7 MPa
4		34.4 MPa
3	Density according to EN 323	1.37 g/cm³
4		1.40 g/cm³

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